Industrial Design Course Content

1st Semester

DE 601 Introduction to Studio Photography

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Lens, Focal Length, Exposure (Shutterspeed, Aperture, ISO), Depth of Field, Histogram, Picture Styles, RAW image, Digital Imaging, Sensor, Crop Factor, Light Meter (Incident, Reflected), Studio Lighting, Flash Photography, Tabletop Photography.

**Texts / References**


DE 603 Presentation and communication skills

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Introduction to presentation methods and technologies. Understanding and creative applications of these media.
- Design principles for creating presentations, slides and report writing.
- Creative writing, articulation, narration exercises.
- Final Project: Documentation and presentation exercise.
**DE 605 Workshop Skills**

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Introduction to workshop safety, best practices and workshop discipline and rules.
- Introduction to workshop machines and hand on operation of each tool
- Introduction to prototyping materials, processes, and prototyping techniques.
- Modern prototyping technologies and working with CAD.
- Painting and Finishes
- Prototyping a product

**Texts / References**

It is a lab course. Hands-on and practical experience based exercises to be done by students under expert supervision.
**DE 607 Studies in form 1**

### Course Content
(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Introduction to 2 dimensional and 3 dimensional form. Radii manipulation in 2D and 3D form
- Exploration of surface textures in different materials.
- 2 and 3D Form transition. Exploration of form to develop imagination and insight.
- Use of metaphors to generate new forms. Concept of family of forms.
- Introduction to 3D geometry. Basic 3D Forms: cube, tetrahedron, octahedron etc. And their imaginative use in generating complex forms and structures.
- Use of combinatrics as a method of 3D form generation.
- Form, material and process relationship.

### Texts / References

- Itten, Johannes; The Art of Color: The Subjective Experience and Objective Rationale of Color, John Wiley & Sons; 1 edition (December 1997)
- Hannah, Gail Greet; Elements of Design, Princeton Architectural Press, 1, July 2002
- Byers, Mel; The Design Encyclopaedia, Publisher: John Wiley & Sons Publications, (8 August 1994)
- Livio, Mario; The Golden Ration: The Story of PHL, the World’s Most Astonishing Number, Publisher: Broadway, 2003.

**DE 609 Product Design 1**

### Course Content
(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Design Definitions and Design Spectrum
- Product Attributed – Function and Emotion
- Product configurations and Component relationships (component Matrix)
- Introduction to Design Research
- Product Analysis – Diachronic, Synchronic
- Understanding and Analysis – Diachronic, Synchronic
- Understanding and Analyzing contexts, parallel situations, future situations
- Understanding modularity and modular systems – 3D lattice and structures
- Design of Modular System – abstract design
- Process of conception and its documentation
- Seminar and exercises related to above topics
**Texts / References**

- Roozenburg and Eekels, Product Design: Fundamentals and Methods, Publisher: John Wiley & Sons Inc; New Ed edition, 1995
- Cagan, Jonathan; Vogel, Craig M.; Creating Breakthrough Products: Innovation from Product Planning to Program Approval, Publisher: Financial Times Prentice Hall; 2002
- Rouse, William B.; Design for Success: A Human- Centered Approach to Designing Successful Products and Systems, Publisher: Wiley-Interscience; January 8, 1991

**DE 611 Elements of Design**

**Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):**

- An introduction to basic elements: Line, texture, colour, form, symmetry, balance, scale, mass, unity and variety.
- Concept of visual language and visual design
- Introduction to Gestalt Laws, composition and figure and ground relationship.
- Introduction to concept of negative space.
- Introduction to typography and fonts.
- Use of grids in graphic composition.
- Colour circle, colour combinations and its dimensions: hue, value and chroma.
- Colour meanings in traditions and psychological use of colours.
Texts / References

- Gail Greet Hannah, Elements of Design, Princeton Architectural Press (1 July 2002)
- Itten, Johannes; The Art of Color: The Subjective Experience and Objective Rationale of Color, John Wiley & Sons; 1 edition (December 1997)
- Kepes, Gyorgy; Language of Vision, Dover Publications, 1 December 1995
- Elam, Kimberly; Geometry of Design: Studies in Proportion and Composition, Princeton Architectural Press (1 August 2001)
- Lawlor, Robert; Sacred Geometry: Philosophy and Practice (Art and Imagination), Publisher: Thames & Hudson, 1989
- Hall, Edward Twitchell; The Hidden Dimension, Publisher: Anchor; Reissue edition, 1990
- Bachelard, Gaston; Jolas, Maria (Translator); The Poetics of Space, Publisher: Beacon Press; Reprint edition, 1994
- Livio, Mario; The Golden Ratio: The Story of PHI, the World's Most Astonishing Number, Publisher: Broadway, 23 September 2003
- Workshop skills (advanced model making and prototyping)

DE 627 Indian thoughts and tradition

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

This is an exposure course to Indian thought and traditions which will cover various domains like Indian visual art, oral traditions, music, dance, theatre, science, health and architecture and society that make India stand out uniquely as a nation because of its diversity of cultures, languages, religions and customs

**Visual Art** – Traditional and contemporary schools of Indian Art, folk art

**Oral Traditions** from the ancient to the present

**Music** – Classical (Hindustani & Carnatic), Semi-classical, Folk, Fusion

**Dance** – Classical, Folk, Contemporary

**Theatre** – Traditional (Natashastra), Contemporary, Puppet Theatre

**Science** – An understanding of the scientific approach to everything and the holistic approach to it and how it influenced all aspects like health, architecture, management and even the arts.

Post independence understanding of India as a nation and bridging the wealth of the past with the potential of the future.

Reflection of this exposure to the question – What is or what can be called “Indian” Design
DE 637 User studies

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Gathering user data through observation and contextual interviews
- Interpreting interviews with team members, creating work models (Flow, sequence, culture, physical, artefact etc.)
- Consolidating data across users with techniques such as affinity diagrams and personas
- Using data in the design process
- Comparison of contextual interview to other techniques such as survey research, focus groups, Rapid Assessment Procedure, task analysis.

Texts / References

- Beebe, James; Rapid Assessment Process; Rowman & Littlefield (2001)
- Beyer, Hugh; Holtzblatt, Karen; Contextual Design: Defining Customer Centered Systems; Morgan Kaufmann (8 December 1997)
- Hackos, JoAnn T; Redish, Janice C., User and Task Analysis for Interface Design; Wile (3 March 1998).
- Handwerker, W. Penn; Quick Ethnography; Altamira Press (2002)
- Mike Kuniavsky; Observing the User Experience, Morgan Kaufmann (2003)
### DE 663 Sketching 1

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Exercises on lines, curves to improve the hand mind coordination.
- 1, 2 and 3 point perspectives. Theory and examples form nature.
- Drawing of objects from outdoor.
- Exercises for improving observation and visual memory.

**Texts / References**

- Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher: Tarcher; 2002
- Demers, Owen; Digital Texturing & Painting, Publisher: New Riders Press; Bk & CD-Rom edition, 2001
- Pogany, Willy; The Art of Drawing, Publisher: Madison Books, 1996.

### 2nd Semester

**DE 602 Product Interface Design**

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Investigations and study of visual, functional and ergonomic requirements of control and display interfaces. Legibility of display elements, character of different typefaces and their readability.
- Study of the process of building interactions.
- The course involves an interdisciplinary approach including User Centered Design Process, Activity Analysis, Structuring of Content, Participatory Design, Experiential Ideation, Scenario Building, Linear and Animatic storyboarding, Soft Physical Prototyping Techniques.
- The students will collaboratively design an interactive product interface.
**DE 604 Introduction to product ergonomics**

**Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):**

- Introduction to the concept of ergonomics in design
- Analysis of MME system design, How to assess the interface design, Design methodology
- Body dimensions and is application in design
- Dimensional optimization for the population and use of percentile
- The musculo-skeletal system and joint motion study, Human body follows the principle of lever
- Basic model on calculation of biomechanical stresses on our body
- Design for the physically challenged
- Mini Project work involving Ergonomic design research for product system.
Texts / References

- E. Grandjean: Fitting the task to the man, Taylor & Francis Ltd; 3rd edition (January 1980).

DE 606 Studies in form 2

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Form exploration in the context of products.
- Expressions in Form like soft, hard, warm, cold, precise, gross, delicate, strong, fragile, rugged etc.
- Study of product expressions by analyzing in terms of elements like form, proportion, colour, texture etc.
- Introduction to abstraction in form. Study of 3D abstraction in art and sculpture. Exploration of industrial material and processes as elements of design through 3D abstraction of entities in Nature.
DE 608 Product Design 2

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- The emphasis of the course is on group design projects. Selection of the projects is based on the possibility of user interaction leading to innovation. Projects end with a comprehensive presentation through working/mock up models, design drawing and a report.
- The project is supported by detailed discussion on various stages in the design process emphasizing the complementary nature of systematic and creative thinking.
- This is achieved by short supporting assignment in following topics: Creativity techniques like brain storming & synectics to develop creative attitude and open mind, design opportunity, problem perception, Idea Sketching , clustering of ideas for concept development, exploratory mock up models for concept development, evaluation of concepts, final concept selection, concept development, refinement and detailing.
### DE 610 Nature of Materials and Processes

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Design Limitations and specific advantages of plastic modelling processes.
- Assembly and Decorative techniques for plastic product manufacturing processes and assembly techniques for ferrous and non-ferrous metals.
- Concepts of structure and costing.
- Significance of form in structural strength of products. Influence of materials and processes on product aesthetics.
- Industrial finishes for plastic, wood and metals.
- Properties and use of rubber, ceramics and glass. Properties of nature materials like wood, bamboo, cane, leather, cloth, jute and paper and their use at craft and industrial levels.

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<td>Cleminshaw D., Design in Plastics, Rockport Publishers Inc. (22 February 1994)</td>
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DE 612 Design Issues

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

This course will contain two predominant approaches. The first is reflective which will help students to ponder on the very basic yet subjective questions like what makes a good designer.

- It will address understanding perceptions & paradigms which enable students to “think outside the box’ by identifying the boxes on creates inadvertently while designing.
- It will deal with the tangible and intangible relevance off broadening one’s perspectives in Arts Aesthetics, Science and Technology to design.

The second is an exposure to different thoughts and perspectives, concerns and issues in the Context of design.

- The challenges in design, layers or user experience, design process
- Design for the real world
- It will also expose the students to emerging areas of design,
- Relevance of design in the context of India,
- Importance of sustainable design practices, preserving traditional practices & designing for the underserved communities.
- Lastly it will provide an exposure to the design process.

Texts / References

- Covey, S. The Seven Habits of Highly Effective People. Free Press; 1st edition (September 15, 1990)
- Athvankar, Uday, Mental Imagery as a Design Tool, Cybernetics and Systems, Vol 28, No 1, Jan-Feb, 1997, pp 25-42.
- Poovaiah, Ravi and Sen, Ajanta. Design by People within Culturally-rooted Idioms – the new ‘cool’ in a globalised world: - paper at ICSID Educational Conference at Copenhagen, Sept. 2005
### DE 614 Design Workshop

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- An independent one week workshop which involves working on actual design problems with practicing professionals. Study of various techniques used in Design execution like Calligraphy, Pottery and Ceramics, Printmaking, Theatre, Film and Video, Performing Arts Sculpture, Painting, Story Telling and Narrative, Toy Design, Book Design, Sound Design, Exhibition Design, Information Graphics and Way finding, Environment etc.

**Texts / References**


### DE 654 Sketching 2

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

- Perspectives and Object drawing
- Light and shadow
- Renderings
- Live sketching of people, object, animals
- Exercises in studio lighting

**Texts / References**

- Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher; Tarcher; 2002
- Pogany, Willy; The Art of Drawing, Publisher; Madison Books, 1996
- McKim, Robert; Experiences in Visual Thinking, Publisher: Brooks / Cole Publishing Company, 1980
### Course Content
(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Analysis of history of Design, Bauhaus, Ulm.
- Analysis of history of Design in India. Analysis of design in the context of India.
- Cultural studies. Discourse analysis.
- An Introduction to Theatre.
- An introduction to Documentary Films.
- Critical writing in Art, Design, Theatre and Film.
- An Introduction to Humanities and Social Sciences.
- Qualitative methods – ethnographic, historical, philosophical, case study, and interview.

### Texts / References

- Mario, Bussagli; Sivaramamurti, C.; 5000 Years of Art in India, L.N.Abrams, NY, 1981.
- Ananda, Coomaraswamy; The Dance Of Siva, Kessinger Publishing, LLC (September 15, 2006)
- Eames, Charles and Ray; The India Report, NID, 1958
- Neil, Gershenfield; When Things Start to Think, Published by Hodder & Stoughton Ltd 07/01/1999
- Gropius, Walter (Author); Pick, Frank (Introduction); Shand, P. Morton; The New Architecture and The Bauhaus, The MIT Press; F First Edition Thus, Later Printing edition (March 15, 1965)
- Morris, William (Author); Kelvin, Norman (Editor); William Morris; on Art and Socialism, Dover Publications (August 9, 1999) ISBN-13: 978-0486409047
- Trivedi, Kirti (ed.); Indian Symbology, IDC, 1987
- Raizman, David; History of Modern Design, Publisher: Pearson Prentice Hall; 2nd edition (July 9, 2010)
- Spitz, Rene; The Ulm School of Design: A View Behind the Foreground, Publisher: Edition Axel Menges (March 20, 2002)
- Lupton, Ellen; Miller, J. Abbott (Editor); The ABC’s of Bauhaus, The Bauhaus and Design Theory, Publisher: Princeton Architectural Press (June 15, 2000)
**DE 707 Design Research Methodologies**

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

This course offers an introduction to research methods used in the design process for post-graduate students of all branches of design. Topics which will be covered include: Introduction to qualitative research methods used in design, Introduction to quantitative methods, exploratory, inferential and casual research, Research Design and Introduction to Reading research and Reporting research.

**Texts / References**

- Doing Research in Design by Christopher Crouch, Bloomsbury Academic (May 8, 2012)
- A Designer's Research Manual by Jennifer Visocky O'Grady, Kenneth Visocky O'Grady, Rockport Publishers (October 1, 2006)
- Practical Research: Planning and Design by Paul D. Leedy, 1980, January 3, 2015

**DEP 701 M.Des Project 1**

**Course Content** *(List of the topics/sub-topics to be covered in the lectures/practicals/assignments):*

The summer internship provides an opportunity for you to work in rural or urban scenarios, based on your preferences and it hopes let you explore the impact design can have on our society, given the backdrop of socio-economic and cultural context of our country.

The duration of the project is four weeks.

All the students will have to make a presentation after they have completed their internships.

**Texts /References**

As per project choices.
DEP 703 M.Des Project 2

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

The communication design projects are chosen in areas that include film and video, typography, information design, graphic design, illustrated books and book design, animation and interaction design. This is the equivalent of the final dissertation project leading to the degree of M.Des in Communication Design.

- Duration: 4 months from July–Nov.
- This project will be an extension of the project III and should include development of the final design concept. The defence presentations will be held during the month of April and time given till the end of June to complete the jury feedback, final drawings and finer detailing of the project.
- The evaluation of the Stage 2 of Project III is done by a panel of examiners appointed by DPGC. The panel will consist of external jury member along with an internal examiner, the guide and the chairman (A Professor or an Associate Professor from another Department of IIT Bombay)

Texts/References
As per project choices.

4th Semester

DE 702 Arts Design and Society 2

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

- Key issues in visual arts (painting and installation art, photography, films), performing Arts public art.
- Concepts and concerns, and discourse on contemporary arts practice.
- The course involves talks by visiting artists, writers, film-makers, theatre artists as well as site visits to organizations and institutions that support arts-based activities and education.
Texts / References

- Pal, Pratapaditya (ed. ); 2000: Reflections on the Arts in India, Marg, 2000
- Subramanyan K. G.; Moving Focus: Essays on Indian Art, Seagull Books, Kolkata, 2006
- ISBN Number : 81 7046 199 5

DEP 702 M.Des Project 3

Course Content (List of the topics/sub-topics to be covered in the lectures/practicals/assignments):

The communication design projects are chosen in areas that include film and video, typography, information design, graphic design, illustrated books and book design, animation and interaction design. This is the equivalent of the final dissertation project leading to the degree of M.Des in Communication Design.

- Duration: 5 months from December – May.
- This project could be an extension of the previous project (if the scope of the project justifies the extension) or it could be an independent project with one of the following focus:
  - Design project of student interest and / or faculty interest and / or industry project
  - Re-design project that relooks at an existing problem or situation
  - Research project, delving into methodological or pedagogic issues
  - Exploration project, exploring application possibilities in a new technology or medium or variations
  - The evaluation of the Stage 1 of Project III is done internally with a panel appointed by the DPGC in consultation with the guide. The panel will consist of the guide and two other faculty members.

Texts / References

As per project choices.